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Original Research Paper

General Medicine

A STUDY OF INCIDENCE OF THROMBOCYTOPENIA IN MALARIAL PATIENTS AT A TERTIARY HOSPITAL

Bharat Goyani — 3rd year resident, Department Of General Medicine, Geetanjali medical college and hospital,Udaipur-313002.

Amit Mehta* — Assistant Professor, Department Of General Medicine, Geetanjali medical college and hospital,Udaipur-313002.*Corresponding Author

ABSTRACT

Background & Objective: Malaria is a major public health problem in the tropics with increased morbidity & mortality. It is a protozoal disease caused by parasite of genus plasmodium and transmitted to man by infected female anopheline mosquitos. Anemia and thrombocytopenia are most common. We conducted this study to find out incedence and degree of thrombocytopenia. **Method:** This study was conducted at Geetanjali medical college and hospital,Udaipur,over 6 months period. A total 500 malaria positive cases studied with thick & thin smears stained with Field's stain and platelet count. **Results:** In the study of 500 patients: 350 positive for P. Vivax,150 positive for P. Falciparum Out of 350 cases of P. Vivax 300 cases had thrombocytopenia with most cases of Grade 1 & 2 and of 150 cases with P. Falciparum 125 cases had thrombocytopenia with most cases of Grade 3& 4. So in our study, 85% malaria positive cases had thrombocytopenia. **Conclusion:** Incidence of thrombocytopenia in a patient with acute febrile illness increases the probability of malaria. Findings can use to avoid unnecessary platelet transfusion in malarial patients.

KEYWORDS : Malaria, P. Falciparum, P. Vivax, Thrombocytopenia.

INTRODUCTION:

Malaria is a major public health problem in the tropics with increased morbidity and mortality.

It is a protozoal disease caused by infection with parasites of the genus Plasmodium and transmitted to man by certain species of infected female anopheline mosquito. Five species of Plasmodium (P. vivax, P.falciparum, P.ovale, P, malariae, P.knowlesi) cause malaria in humans.

From all this five species P.vivax and P.falciparum are the most common. According to World malaria report 2015, there were 214 million cases of malaria with 438000 deaths. The burden was heaviest in WHO African region accounting for 90% of malaria death with more than 2/3rd of death occurring in children aged under 5years[1].Malaria can cause various hematological abnormalities in patients, of which Anemia and Thrombocytopenia are most common. It comprises three distinct stages: Cold, Hot & Sweating. Clinical features vary from mild, moderate & complicated depending on--Species of malarial parasite present, Patient's state of immunity, Intensity of infection and Presence of concomitant conditions. Malaria parasite affects multiple organs of the body such as liver, spleen, brain, gastro intestinal tract, gall bladder, pancreas, blood vessels and placenta. Hence the clinical picture could be of wide spectrum ranging from simple malaise to life threatening central nervous symptoms like coma[2,3].

A number of observational studies have confirmed the association of thrombocytopenia to malaria. Both non-immunological as well as immunological destruction of platelets have been implicated in causing thrombocytopenia. The speculated mechanisms are coagulation disturbances, sequestration in spleen, antibody mediated platelet destruction, oxidative stress and the role of platelets as cofactors in triggering severe malaria. Abnormalities in platelet structure and function have been described as a consequence of malaria and in rare instances platelets can be invaded by malaria parasites[4,5,6]. We conducted this study to find out the frequency and the degree of thrombocytopenia in patients with malaria, to know the common parasitic species and sex predominance.

METHODS:

The study was conducted at Geetanjali medical college and hospital,Udaipur over six months period. A total 500 malaria cases positive on peripheral smear were studied. Malarial parasites were detected by thin & thick smear examination. Thin smear stained by Leishman stain & thick were stained by Field stain. In Field stain polychromatic methylene blue & eosin stains specifically to basophilic & acidophilic cellular elements to demonstrate blood cells and parasites. Absolute platelet count was done by automated analyzer 'XT1800-Sysmex' in hematology department. Data were analyzed and patients with thrombocytopenia have been divided into following five grades:

Grade 0–Within normal limit (1,50,000 or above)
Grade 1-Between 75,000 to 1,50,000
Grade 2-Between 50,000 to 75,000
Grade 3-Between 25,000 to 50,000
Grade 4-Less than 25,000

From this grading, patients were categorized according to parasite infection.

RESULTS:

We conducted this study of 500 malaria positive cases. Result are shown in table 1 and 2.

Most common are grade 1 & grade 2 thrombocytopenia in P. Vivax and grade 3 & 4 thrombocytopenia in P. Falciparum.

Table-1: Distribution Of Malarial Infection According To Species And Sex

Malarial Infection	No. Of Cases With %	Female (No. Of Cases With %)	Male (No.Of Cases With %)
P.Vivax	350(70%)	144 (41.14%)	206 (58.85%)
P.Falciparum	150 (30%)	51 (34%)	99 (66%)
Total	500	195 (39%)	305 (61%)

P.vivax is comparatively more common than P.Falciparum and it is more common in males.

Table-2: Distribution Of Malarial Infection According To Species And Severity Of Thrombocytopenia

Severity Of Thrombocytopenia In P.Vivax	P. Vivax No. Of Cases With %	P. Falciparum No. Of Cases With %
Grade 1 (75,000-1,50,000)	89 (29.66%)	17 (13.6%)
Grade 2 (50,000-75,000)	128 (42.66%)	14 (11.2%)
Grade 3 (25,000-50,000)	55 (18.33%)	64 (51.2%)

Grade 4 (Less Than 25,000)	28 (9.33%)	30 (24%)
Total	300 (100%)	125 (100%)

DISCUSSION:

Malaria caused by P. Vivax & P. Falciparum is endemic in many parts of India. It affects almost all blood components & it is a true hematological disease. Thrombocytopenia & anemia are the most frequent malaria associated hematological complications. In endemic areas malaria has been reported as the major cause of low platelet counts.

Table -3 Comparison Of Most Common Malarial Species With Other Study

Malarial Species	P. Vivax	P.Falciparum	Total
Present Study	70%	30%	500
S.J.Khan Study [18]	32%	68%	121
N.K.Gupta Study [19]	56.51%	43.47%	230

This is so characteristic of malaria, that in some places, it is used as an indicator of malaria in patients presenting with fever. Platelets count of less than 150,000/cumm increases the likelihood of malaria 12-15 times[7,8,9] . Faseela et al.[5] in her study found similar results. In our study, thrombocytopenia was seen in 85% cases. Colonel et al.[10] reported thrombocytopenia in 72% of patients with malaria infection. Jamal et al.[11] in their study on pediatric patient have reported low platelet count in 72% of the patients with malaria infection. However, few studies reported slightly lower incidence of thrombocytopenia like 40%[6] and 58.97%[12]. Exact mechanism of thrombocytopenia in malaria is unknown. Fajardo and Tallent[13] demonstrated P. vivax within platelets and suggested a direct lytic effect of the parasite on the platelets. Both non-immunological destruction as well as immune mechanisms[7] involving specific platelet associated IgG antibodies that bind directly to malarial antigen in the platelets have been recently reported to play a role in the lysis of platelets[14] .

Table-4: Comparison Of Thrombocytopenia Grading Of Our Study With Other Study:-

Malarial Infection	Thrombocytopenia Grade	Present Study	S.J. Khan Study [18]	N.K.Gupta Study [19]
P.Vivax	Grade-1	29.66%	38%	20%
	Grade-2	42.66%	36%	25%
	Grade-3	18.33%	15%	40%
	Grade-4	9.33%	11%	15%
P.Falciparum	Grade-1	13.6%	20%	15.42%
	Grade-2	11.2%	32%	28.57%
	Grade-3	51.2%	36%	50%
	Grade-4	24%	12%	6.0%

Oxidative stress damage of platelets has also been implicated in the etiopathogenesis based on the finding of low levels of platelet superoxide dismutase and glutathione peroxidase activity and high platelet lipid peroxidation levels in malaria patients, when compared to those of healthy subjects[15].Decreased thrombopoiesis has been ruled out, because platelet forming megakaryocytes in the marrow are usually normal or increased[7,15,16,17]. We found thrombocytopenia in P.vivax & P.falciparum. Out of which more cases are of P.vivax & most severe grade of thrombocytopenia is observed in P.falciparum. In S.J.Khan study[18] P.Falciparum is most common, while in N.K. Gupta study[19] P.Vivax is most common. In P.Falciparum Grade 3 Thrombocytopenia Is Common In All Studies.

CONCLUSION:

Incidence of thrombocytopenia in a patient with acute febrile illness increases the probability of malaria. Thrombocytopenia occurs in both malaria but it is more severe in P. falciparum as compared to P.vivax. Findings can use to avoid unnecessary platelet transfusion in malarial patients.

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